

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended): An electronic magnetic-based indicator tool comprising:
a housing having an electronic display;
a plurality of magnetic field sensors, the plurality of magnetic field sensors grouped into sets of magnetic field sensors to determine spatial location and orientation of a magnetic indicator device associated with a valve of an implantable flow control device; and
a processing module that receives ~~for receiving~~ magnetic data values from the plurality of magnetic field sensors and determines ~~for determining~~ a setting for the a valve on the ~~an~~ implantable flow control device using the a determined orientation of the a magnetic indicator device.

Claim 2 (Currently Amended): The electronic magnetic-based indicator tool according to claim 1, wherein the processing module further determines the setting of the valve on the implantable flow control device using a determined orientation of a reference magnet coupled to the implantable flow control device at a location separate from the magnetic indicator device.

Claim 3 (Currently Amended): The electronic magnetic-based indicator tool according to claim 1, wherein the processing module generates a display image corresponding to an ~~the~~ orientation of the valve relative to the implantable flow control device and outputs the display image on the electronic display.

Claim 4 (Original): The electronic magnetic-based indicator tool according to claim 1, wherein the processing module determines an estimate for ambient magnetic fields from a sequence of magnetic data values from the plurality of magnetic field sensors.

Claim 5 (Original): The electronic magnetic-based indicator tool according to claim 4, wherein the processing module further subtracts the estimate for ambient magnetic fields from received magnetic data values to determine the setting of the valve on the implantable flow control device.

Claim 6 (Currently Amended): The electronic magnetic-based indicator tool of claim 1, wherein the plurality of magnetic field sensors comprises four sets of three sensors for determining location and orientation of the a magnetic indicator device in five degrees of freedom.

Claim 7 (Original): The electronic magnetic-based indicator tool of claim 6, wherein each of the four sets of three sensors being located about a respective one of four corners of the indicator tool.

Claim 8 (Currently Amended): The electronic magnetic-based indicator tool according to claim 1, wherein the indicator tool further comprises an adjustment tool that modifies an ~~for-modifying the~~ orientation of the valve in the implantable flow control device.

Claim 9 (Currently Amended): The electronic magnetic-based indicator tool according to claim 8, wherein the adjustment tool comprises a magnetic adjustment component that magnetically couples ~~for magnetically coupling~~ to the magnetic indicator device of the flow control device.

Claim 10 (Currently Amended): The electronic magnetic-based indicator tool according to claim 9, wherein rotating the adjustment tool while the magnetic adjustment component is magnetically coupled to the magnetic indicator device of the flow control device causes the valve of the flow control device to rotate changing the setting of the valve.

Claim 11 (Currently Amended): The electronic magnetic-based indicator tool according to claim 1, wherein the tool further comprises:

a removable data storage device, the data storage device containing computer readable data that translates for translating the setting of the valve setting to a pressure for the implantable flow control device.

Claim 12 (Original): The electronic magnetic-based indicator tool according to claim 11, wherein the removable storage device being from a group of removable data storage devices consisting of compact flash memory device, a secure digital memory device, a smart media storage device, and a memory stick memory device.

Claim 13 (Currently Amended): The electronic magnetic-based indicator tool according to claim 11, wherein computer readable data ~~for translating~~ that translates the setting of the valve setting to the pressure for the implantable flow control device corresponds to a particular model of corresponding to the implantable flow control device.

Claim 14 (Currently Amended): The electronic magnetic-based indicator tool according to claim 11, wherein the indicator tool further comprises user controls that activate ~~for activating~~ the operation of the tool and a power supply.

Claim 15 (Original): The electronic magnetic-based indicator tool according to claim 14, wherein the power supply comprises a removable battery.

Claim 16 (Currently Amended): A system comprising:
an implantable medical device comprising a magnetic indicator device ~~first magnet~~ associated with a valve of an implantable flow control device that indicates to indicate a current device setting of the implantable flow control device;

an electronic magnetic-based indicator tool comprising:

a housing having an electronic display;

a plurality of magnetic field sensors, the plurality of magnetic field sensors grouped into sets of three magnetic field sensors; and

a processing module ~~that receives~~ ~~for receiving~~ magnetic data values from the plurality of magnetic field sensors and ~~determines~~ ~~for determining~~ a setting for ~~the~~ a valve on ~~the~~ an implantable flow control device using a determined orientation of ~~the~~ a magnetic indicator device coupled to the valve; and
an adjustment tool ~~that modifies an~~ ~~for modifying the~~ orientation of the valve in the implantable flow control device, the adjustment tool comprises a magnetic adjustment component for magnetically coupling to the magnetic indicator device of the flow control device.

Claim 17 (Currently Amended): The system according to claim 16, wherein the processing module further determines the setting of the valve on the implantable flow control device using a determined orientation of a reference magnet coupled to the implantable flow control device at a location separate from the magnetic indicator device.

Claim 18 (Original): The system according to claim 16, wherein the processing module generates a display image corresponding to the setting of the implantable flow control device and outputs the display image on the electronic display.

Claim 19 (Original): The system according to claim 16, wherein the processing module determines an estimate for ambient magnetic fields from a sequence of magnetic data values from the plurality of magnetic field sensors.

Claim 20 (Original): The system according to claim 19, wherein the processing module further subtracts the estimate for ambient magnetic fields from received magnetic data values to determine the setting of the valve on the implantable flow control device.

Claim 21 (Currently Amended): The system according to claim 16 ~~1~~, wherein the tool further comprises:

a removable data storage device, the data storage device containing computer readable data ~~for translating~~ that translates the setting of the valve ~~setting~~ to pressure for the implantable flow control device.

Claim 22 (Original): The system according to claim 21, wherein the removable storage device being from a group of removable data storage devices consisting of compact flash memory device, a secure digital memory device, a smart media storage device, and a memory stick memory device.

Claim 23 (Currently Amended): The system according to claim 21, wherein computer readable data ~~for translating~~ that translates the setting of the valve setting to pressure for the implantable flow control device corresponds to a particular model ~~of corresponding to the~~ implantable flow control device.

Claim 24 (Currently Amended): The system according to claim 21, wherein the indicator tool further comprises user controls that activate ~~for activating the~~ operation of the tool and a power supply.

Claim 25 (Currently Amended): The system according to claim 24 ~~14~~, wherein the power supply comprises a removable battery.

Claim 26 (Original): A method comprising:

placing an electronic magnetic-based indicator tool adjacent to an implantable medical device, the implantable medical device having a magnetic indicator device coupled to a valve used to control operation of the medical device;

measuring a magnetic field strength observed by the indicator tool;

estimating a portion of the observed magnetic fields caused by an environmental magnetic field;

determining an orientation of the magnetic indicator device relative to a known position of the implantable medical device using the observed magnetic field and the estimate for the environmental magnetic field; and

indicating a device setting of the implantable medical device.

Claim 27 (Original): The method according to claim 26, wherein the known position of the implantable medical device is determined from an expected orientation of the indicator tool relative to the implantable medical device.

Claim 28 (Original): The method according to claim 26, wherein the known position of the implantable medical device is determined from determining a location and orientation of a reference magnetic device coupled to the implantable medical device.

Claim 29 (Original): The method according to claim 26, wherein the measuring the magnetic field comprises:

receiving electronic signals from a plurality of magnetic field sensors, the magnetic field sensors grouped into a plurality of sets of three sensors located at separate locations within the indicator tool; and

processing the received electronic signals to determine an orientation and location of a magnetic device.

Claim 30 (Currently Amended): The method according to claim 29, wherein the plurality of sets of three sensors comprise four sets of sensors-~~sensor~~, each of the four sets of sensors being located about a respective one of four corners of the indicator tool.